

of questions asked whether, if the person knew that TV programs in general, and science programs in particular, would be described, s/he would seek out those programs.⁴⁰ In both cases, a strong majority of the participants (67% and 72%, respectively) said they would seek out the described programs, while another 7 percent answered that they could not because they had no television, or had a TV without a SAP channel, or didn't know when described programs would be shown.

COGNITIVE IMPACTS

In this portion of the report, we examine the extent to which adding description enhances the amount of information participants learn while watching science programs.

During the viewing session, all participants first saw the program "Orphans of Time" and then answered 18 multiple choice questions about the content of the program before answering questions about their reactions to the program. After a break, they all saw the first half of "Wild Dogs of Africa" and answered 16 multiple choice questions about that program's content. About 1-2 months after they watched the programs, all the participants were asked 5 questions about the content of each program (See Questionnaires 2, 3, and 4 respectively in Appendix C, and the frequencies in Appendix D).

In half the viewing sessions, involving 53 participants, "Orphans of Time" was shown with description followed by "Wild Dogs of Africa" without description; in the other half of the viewing sessions, involving 58 participants, "Orphans of Time" was shown without description followed by "Wild Dogs of Africa" with description. Therefore, each person serves as the experimental subject with regard to the program s/he saw with description and as the control subject with regard to the program s/he saw without description.

Participants in the experimental and control conditions were asked the same questions about the content of the programs. Of the 18 questions asked during the viewing session regarding "Orphans of Time," 8 questions were based on material presented only in the audio description, while 10 questions were based on material drawn from the program as presented without description. (For convenience, we refer to the latter as questions drawn from program narration although, in fact, some are from dialogue, sound effects, etc.) Of the 16 questions about "Wild Dogs of Africa," 6 were based on the audio description, 10 on the program

4:27 Thinking specifically about TV programs about science, do (would) you prefer to have no added description, or a little added description, or some added description, or a lot of added description?

⁴⁰ 4:37 Do you seek out programs if you know they will be described?

4:38 Do you seek out programs dealing with science topics if you know they will be described?

narration. The follow-up interview contains five questions about each program, 2 drawn from the DVS description, 3 from the program narration

The data from these content questions allow us to make several types of comparisons. First, we examine short-term learning. For each program we compare the number of questions experimental and control participants answered correctly immediately after watching the program. Then for each program, we examine separately those questions drawn from the added DVS description and from the program narration. Second, to examine the extent to which information is retained, we make similar comparisons of the questions about the programs that were asked several weeks after they attended the viewing session.

Immediate Recall of Information

The data cited in this section are summarized in Table 3

All Questions

In response to the "Orphans of Time" program, the experimental group, which saw the described version, answered significantly more questions correctly than did the control group. Of the 18 questions, the experimental group answered an average of 10.4 questions correctly in contrast to the control group's average of 9.2 ($t=2.03$, $p=.02$).

With regard to "Wild Dogs of Africa," the difference between the experimental group scores and the control group scores was highly significant. The experimental group answered an average of 11.0 of the 16 questions correctly in contrast to the control group which answered an average of 7.5 questions correctly ($t=6.22$ $p<.001$)

Table 3

**Cognitive Impacts of Viewing TV Science Programs with and without Description:
Experimental and Control Participants' Mean Number of Correct Answers to Viewing
Session Questions**

Program/ Questions	Experimental Group (with description) Mean	Control Group (without description) Mean	t-test	Probability (one-tailed)
"Orphans of Time"				
All Questions (N=18)	10.4	9.2	2.03	.02
Narrated (N=10)	6.8	7.2	-1.03	NS
Described (N=8)	3.6	1.9	4.77	< .001
"Wild Dogs of Africa"				
All Questions (N=16)	11.0	7.5	6.22	< .001
Narrated (N=10)	7.0	6.7	0.69	NS
Described (N=6)	4.0	0.8	12.73	< .001

Questions Drawn from DVS Description and Program Narration

Separating the described and narrated questions helps to account for the differences in the number of questions answered correctly by the experimental and control participants.

"Orphans of Time" contains 8 questions drawn from the DVS description along with 10 questions drawn from the program narration. Of the questions based on described material, the experimental group answered an average of 3.6 questions correctly while the control group answered 1.9 correctly, a highly significant difference ($t=4.77$, $p<.001$). However, on the questions drawn from the program narration, the experimental group answered slightly fewer questions correctly than did the control group (6.8 and 7.2, respectively). The difference between the means is not statistically significant ($t=-1.03$, $p=NS$).

"Wild Dogs of Africa" contains 10 questions drawn from the program narration and 6 questions drawn from the DVS description. The experimental and control participants show a slight difference in the average number of questions drawn from the program narration that they answered correctly (7.0 and 6.7, respectively); this difference is not statistically significant ($t=0.69$, $p=NS$). However, the experimental participants answered correctly an average of 4.0

of the questions drawn from the added description, in contrast to the control participants who answered, on the average, less than one question correctly (0.8); this difference is highly significant ($t=12.73$, $p<.001$).

It is not altogether surprising that some control participants answered some questions correctly although the questions were based on descriptions they had not heard. At least four factors may account for this. First, although all the participants are legally blind, almost two-thirds of the participants have some usable vision and almost one-third report that they rely a lot on their vision when watching TV. Since we wanted to replicate normal viewing conditions as nearly as possible, we allowed participants to seat themselves wherever was most comfortable for them in the viewing session. Thus participants used their vision as they would have at home. Second, for each program some participants reported that they had seen the program previously (13% and 16% for "Orphans of Time" and "Wild Dogs of Africa," respectively).⁴¹ Third, participants may have come to the programs with some prior knowledge of the topics. Finally, since the questions were all in a forced-choice format, by chance alone, one would expect some correct answers. These informational questions were developed with the study's science consultant to assure they assessed pertinent facts.

Whatever the impact of these and other factors, the data show statistically significant differences between the experimental and control groups: in both programs, the experimental participants, who saw the program with audio description, were likely to gain more information from the description than the control participants were able to gather without the description.

Retention of information

The data cited in this section are summarized in Table 4.

All Questions

On the follow-up questions for "Orphans of Time," the experimental and control participants correctly answered 2.2 and 2.4 questions, respectively ($t=-0.78$, $p=NS$). However, for "Wild Dogs of Africa," the experimental group answered 3.5 questions correctly while the control group answered 2.4, a highly significant difference ($t=4.96$, $p<.001$).

Questions Drawn from Audio Description and Program Narration

As one might expect from the answers to all the questions on "Orphans of Time," the experimental and control groups show no significant differences with regard to either the narrated or the described questions. Indeed, the groups have almost identical scores on both the narrated questions (1.7 for both groups; $t=-0.12$, $p=NS$) and the described questions (0.5 for the experimental group and 0.7 for the control group; $t=-1.09$, $p=NS$).

⁴¹ 2:1, 3:1 Do you think you have seen this program before?

For "Wild Dogs of Africa," the experimental group correctly answered significantly more of the questions derived from both the program narration and the DVS description. On the narrated questions, the experimental group answered an average of 2.2 questions correctly, while the control group answered an average of 1.9 ($t=2.26$, $p=.01$). Predictably, the difference on the described questions was even greater: the experimental group answered 1.3 questions correctly, while the control group answered 0.6 ($t=6.61$, $p<.001$).

Table 4

Cognitive Impacts of Viewing TV Science Programs with and without Description:
Experimental and Control Participants' Mean Number of Correct Answers to Follow-up
Interview Questions

Program/ Questions	Experimental Group (with description) Mean	Control Group (without description) Mean	t-test	Probability (one-tailed)
"Orphans of Time"				
All Questions (N=5)	2.2	2.4	-0.78	NS
Narrated (N=3)	1.7	1.7	-0.12	NS
Described (N=2)	0.5	0.7	-1.09	NS
"Wild Dogs of Africa"				
All Questions (N=5)	3.5	2.4	4.96	< .001
Narrated (N=3)	2.2	1.9	2.26	.01
Described (N=2)	1.3	0.6	6.61	< .001

Individual Questions Drawn From Description and Narration

Earlier we presented transcriptions of the program narration and DVS description from two scenes from each program. From these transcriptions one can see the type of information that was being presented verbally with and without description.

All of the cognitive content questions based on the Greek islands portion of "Orphans of Time" are drawn from the two transcribed scenes. Questions 8, 9, 13, and 14 are based on the

DVS descriptions; questions 11 and 12 are based on the program narration.⁴² Table 5 displays the proportions of experimental and control groups that answered each of these questions correctly. For the questions drawn from DVS description, the experimental participants answered correctly approximately 2-4 times as often as the control participants although the

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- ⁴² 2:8 What best describes the water near the Greek caves? The water is
(a) dark blue and clear
(b) clear pale green
(c) murky blue-green
(d) don't know
- 2:9 What kind of rocks surround the Greek caves? The rocks are mainly
(a) smooth worn boulders
(b) white pebbly beaches
(c) rough gnarled cliffs
(d) don't know
- 2:13 When the researchers found seals in the cave, what did the adult seals do?
(a) Some adults escaped into the water, some stayed with the pups
(b) All the adults surrounded the pups to protect them
(c) The adults bared their teeth at the researchers
(d) don't know
- 2:14 What did the pups look like? The pups have
(a) smooth skin
(b) furry skin
(c) grooved skin
(d) don't know
- 2:11 For what evidence were the Greek scientists searching in the caves? They were looking for seals'
(a) tracks
(b) scent
(c) either tracks or scent
(d) don't know
- 2:12 What evidence found by the scientists indicated that the Greek [seals'] population might not be going extinct yet? They found
(a) the three pups in the cave
(b) the young male seal liked people
(c) cleaner sea water
(d) don't know

control participants answered the questions based on the program narration at a slightly higher rate (statistically not significant) than did the experimental participants.

Table 5

Proportion of Experimental and Control Groups Who Correctly Answered Questions
Based on Transcribed Scenes from "Orphans of Time"

Question*	Experimental Group (with description)	Control Group (without description)	t-test	Probability (one-tailed)
8 D	42	10	4.01	< .001
9 D	58	34	2.59	< .01
13 D	64	36	3.04	< .002
14 D	26	14	1.67	< .05
11 N	57	71	-1.55	NS
12 N	70	78	-0.93	NS

* D=audio description

N=program narration

Turning to the scenes from "Wild Dogs of Africa," questions 12 and 14 are drawn from the DVS description while questions 3, 7 and 11 are drawn from the program narration in these passages.⁴³ Table 6 displays the proportions of experimental and control participants who

⁴³ 3:12 When Alpha was moving the pups to a new den, what kind of animal chased her?
It was

- (a) a zebra
- (b) a lion
- (c) a hyena
- (d) don't know

3:14 What do wildebeests look like? Wildebeests have

- (a) thick legs and narrow shoulders
- (b) thick legs and wide shoulders
- (c) spindly legs and wide shoulders
- (d) don't know

3:3 In what kind of setting do wild dogs live? They live

answered each of these questions correctly. For the questions drawn from DVS description, the experimental participants answered correctly 3-9 times as often as the control participants as well as a slightly higher proportion of the questions based on the program narration. The discussion of Tables 5 and 6 show the specific questions drawn from the narration and description in these four scenes.

Table 6

Proportion of Experimental and Control Groups Who Correctly Answered Questions
Based on Transcribed Scenes from "Wild Dogs of Africa"

Question*	Experimental Group (with DVS)	Control Group (without DVS)	t-test	Probability (1-tailed)
12 D	55	6	6.56	< .001
14 D	52	19	3.80	< .001
3 N	88	74	1.94	< .03
7 N	57	53	0.43	NS
11 N	81	72	1.16	NS

* D=DVS description
N=program narration

- (a) in a jungle
- (b) on a grassy plain
- (c) in a forest
- (d) don't know

3:7 During what season of the year are wild dog pups born? Pups are born

- (a) in the dry season
- (b) in the wet season
- (c) in any season
- (d) don't know

3:11 When the den began to smell. Alpha moved the pups. She was trying to avoid

- (a) predators
- (b) disease
- (c) parasites
- (d) don't know

In the viewing session as a whole, including both programs, participants were asked a total of 18 questions drawn from the added descriptions. Taking these questions individually, the difference between the proportion of experimental participants who answered the question correctly and the proportion of control participants who did so is significant in 14 out of the 18 questions. In contrast, only 2 out of 26 questions drawn from the program narration show statistically significant differences.

Putting these findings together with Tables 5 and 6 shows quite dramatically that these study participants were likely to note information that was presented in the DVS descriptions, and they retained that information over the next months

CONCLUSIONS

Audio description of television programs is a relatively recent innovation in the blindness field. Anecdotal evidence has indicated that description is well-received by viewers who are blind or severely visually impaired; however, little has been known about the aspects of television viewing that adding description enhances. In order to obtain a more precise understanding of the types of impacts description has, this research collected attitudinal data on described television programs in general, and television programs relating to science in particular. In addition, it measured differences in attitudes and learning between study participants' response to described and undescribed versions of two specific programs.

This evaluation shows that description has positive impacts in psychological, social, and cognitive domains on blind and severely visually impaired viewers. The participants report that they do watch television but that when they watch television without description, they feel they are missing information that is available to fully-sighted people. For them, adding description makes television programs more enjoyable, interesting, and informative.

The participants also report that having description enables them to use the programs more in social settings. Having programs described makes them more comfortable discussing the programs with sighted friends. It also makes a difference in their ability to talk about the program and to ask others questions about it

The participants in this study believe that having audio description makes programs more informative. Furthermore, experimental data from this evaluation show objectively that the participants did learn information that was presented in the descriptions and that they retained that information over several weeks between the viewing session and the follow-up telephone interview.

Finally, the participants say they prefer to watch described rather than undescribed programs on television and that they would seek out described programs on science topics.

APPENDICES REMOVED - AVAILABLE UPON REQUEST

ATTACHMENT C

Psychosocial Benefits of Accessible Television for Blind/Visually Impaired Persons. Presented at the American Psychological Association National Convention, New York City, August 15, 1995.

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Statement of The Problem:

The importance of television programming as a way of disseminating cultural information and education has long been recognized. The value of making television accessible to a wide audience, including those with disabilities (notably, closed captioning for deaf persons) has also been recognized. Although television is (almost by definition) primarily a visual medium, a technique, "video description", has been pioneered through which television may become accessible to those who cannot see at all, or those who cannot see well. For video description, narrators carefully describe the visual elements of a television program between dialogue, so as not to interfere with the script of the program.

The possible psychosocial benefits to blind and visually impaired people need to be studied in order to continue developing the technique in a way that will provide the most benefit to people and also to inform policy decisions regarding government financial and/or legislative support for video description.

WGBH-Boston, a public television station, offers a number of described programs which are carried by over 100 public television stations nationwide.

Subjects:

Data are from individuals who, on their own initiative, chose to contact WGBH by telephone or by mail in order to offer their opinion on the service provided. One-hundred-fifteen letters and 491 telephone comments (over DVS's 800 number) were received by WGBH since they first implemented the service in 1990. The people commenting include both sexes, varied ages, all levels of blindness (including sighted), and come from all over the country.

Procedure:

Comments were available on many aspects of video description, including opinions on the manner in which shows are described, and on which shows should be described. Only those comments that specifically related to psychosocial

processes are reported here.

Data were categorized into logical groupings according to content (e.g., video description's effect on a person's social interactions or on their viewing enjoyment), in order to establish the psychosocial benefits of this service to blind and visually impaired individuals (as well as to their families and friends.)

Results:

Results fell into seven major categories which are described below. Selected viewer comments are included to illustrate each of the categories.

1) Gaining Knowledge about the Visual World

According to the comments of blind and visually impaired viewers, video description has helped them gain knowledge about various visual aspects of social interaction including information about the types of body language that people exhibit in social circumstances, and about other cultural norms that people typically learn about visually, such as styles of dress and physical appearance. These are important pieces of knowledge that would otherwise be difficult to ascertain through "incidental learning" and which have the potential for aiding a blind or visually impaired person in socializing with others

"It is important that children who are blind find out that what really matters is not whether they can see the world, but rather that they know about the world. Producing 'Mr. Rogers' Neighborhood' in DVS expands the world of these children by noticing the everyday things normally taken for granted and explaining these things carefully and patiently."

"Your descriptions of programs ... bring things to life for me with such clarity that I can picture them perfectly in my mind."

2) Gaining a Better Understanding of Televised Materials

Comments showed that video description helped viewers have a better idea of what is occurring during programming. Better understanding led to increased learning and enjoyment.

"This greater degree of participation in the entertainment experience [provides] increased understanding of the program material as it is being experienced by sighted family and friends."

"I had not realized how much I had been missing and how D.V.S. could enhance my perception of what I was watching. For the first time in over 18 years I did not have to wonder or ask someone what was happening."

In addition to the large number of positive comments from individuals who were blind or visually impaired, comments were received from several people with cognitive impairments who stated that video description helped them to concentrate on programming and to understand it better

3) Feeling Independent

As the previous quote illustrates, description allows people who are blind or visually impaired to feel more independent because they are able to follow what they are watching without the help of others.

[Teenager] "It's almost like having the describer sitting right there in my room with me I don't have to depend on my parents anymore."

"For the first time in my life of 13 years being blind ... I will be able to enjoy ... programs and movies and become more independent."

"I love DVS because it gives me the freedom to watch a movie independently without having to have somebody tell me what is going on."

4) Experiencing Social Connection

Description allows people who are blind or visually impaired to feel included in the social activity of television viewing.

"For me it has opened up a whole new world of entertainment with my family and I'm not excluded anymore"

"I felt I had really seen the movie and could laugh right along with everyone else, not five minutes later after someone had taken the time to explain it all to me."

"It also enables people who are visually impaired to share a movie with their family members . . . This enables an entire family to enjoy the entertainment together."

"The knowledge is making blindness less isolated."

5) Feeling Equality with Those Who do not Have Visual Impairments

Being able to watch television with description is perceived by those with visual impairments as an enjoyable activity, as well as an educational instrument, which they feel they are entitled to, since television is such a large part of the cultural landscape. Being able to watch television as do others without visual impairments leads blind people to feel that they are more similar to others, and allows a similar social and cultural base of knowledge that can be discussed in social interactions (e.g., next day "discussions over the water cooler" about a program that was seen the night before.)

"[We] really depend on Audio description just to keep even with our sighted counterparts."

"[Described shows] put blind people on an equal footing with their sighted peers. When my co-workers discuss TV, for the most part, I cannot participate, and I'd really like to, but cannot do so without DVS services "

"When a picture speaks a thousand words, DVS gives vital information and places blind people on an equal par with their sighted counterparts in the television viewing audience."

"All people have the right to choose to enjoy the arts. It is a duty of the entertainment industry, in this case cinema rights-holders, to allow all people to enjoy films. It is time to share films with all people regardless of a disability or impairment."

6) Experiencing Enjoyment

The most often cited benefit was enjoyment. A large majority of the letters and calls praised the service. In their letters and telephone calls, many people named shows that they enjoyed. Others said that they now watch television more often.

"I just wanted to express my sincere delight in this whole project. It's just wonderful! DVS has really opened up a whole world for me."

"Conjure for yourself the feelings of the first moon walk, a pioneer seeing his new homestead after months of travel, and a kid at Christmas. Combine those feelings and you'll understand what it is like when a new dimension becomes available to an intelligent and inquisitive person who happens to be blind DVS is a new dimension!"

7) Relief of Burden on Sighted Viewers

Finally, an additional benefit of television with video description is relieving the burden felt by family members and friends who often engage in impromptu description when watching non-described television shows with a blind or visually impaired person; sighted viewers often find watching television with that person becomes a more enjoyable experience when the show is described.

"As a sighted person I have no problem with the descriptive video . . . I personally think that it makes my time with my mother easier and more enjoyable"

"It also eliminates the necessity for a sighted person to interrupt his own concentration on the picture to tell us what is going on"

Conclusions:

In summary, results showed that video description provides many psychosocial benefits to blind and visually impaired people. Video description contributes to education, knowledge of important cultural phenomena, improved social interaction, and enjoyment by blind and visually impaired persons. These

benefits of video description promote greater feelings of self-confidence and increased social acceptance.

This technique needs to become more widely known and more available in order to improve further on these important benefits for a greater number of blind and visually impaired people.

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